Photosynthesis Lab Report Guidelines

**Title** – Specific to the variable you chose to manipulate. The title “Photosynthesis” will earn you a ZERO

**Introduction & Hypothesis** – Follow general guidelines on report guide for introduction. Transition into the hypothesis by stating the purpose of the lab. The null hypothesis will be related to the STANDARD TRIAL (that I did and you all copied data from board) and your EXPERIMENTAL TRIAL. Null hypothesis should be stated that there will be NO difference between the two trials.

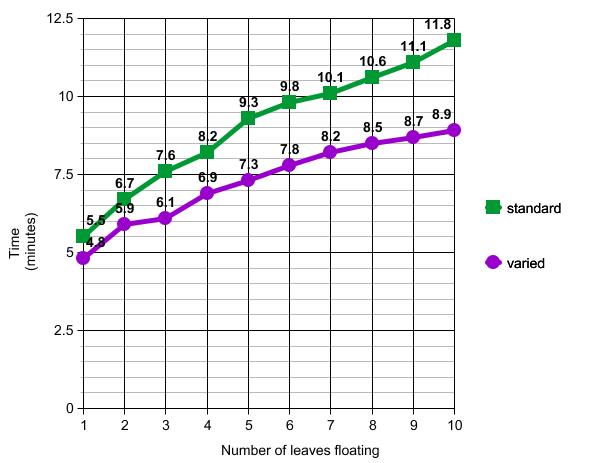
**Methods** – Outline steps I DID for the standard trial. The last steps after that will state that the experiment was repeated exactly the same as standard trial except mention what YOU changed during your experimental trial.

**Results** – Either create 2 separate data tables & 2 separate graphs, OR create 1 data table and 1 graph showing both trials, differentiated by labels. **Summarize the results in a paragraph: which had the faster rate of leaves floating (photosynthetic rate).**

Data table example

Table 1: Time elapsed for leaves to reach surface under standard and varied conditions.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of leaves floating | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Standard Time (minutes) | 5.5 | 6.7 | 7.6 | 8.2 | 9.3 | 9.8 | 10.1 | 10.6 | 11.1 | 11.8 |
| Varied Time (minutes) | 4.8 | 5.9 | 6.1 | 6.9 | 7.3 | 7.8 | 8.2 | 8.5 | 8.7 | 8.9 |

Figure 1: Number of leaves floating over time under standard and varied conditions

**Analysis**: You must complete TWO statistical analyses and discuss the results of both.

1. A t-test using the website: http://www.physics.csbsju.edu/stats/t-test\_bulk\_form.html

Be sure to put in the standard values in one box and the varied values in the second box. If p< .05, reject the null hypothesis. If p > .05, accept the null hypothesis.

2. A Chi-Square Test using the example below from which I used the sample data on the previous page.

See formula for X2 (Chi Square) in the AP Equations & Formula Sheet

O = observed times for leaves to float (your varied data)

E = Expected time for leaves to float (my standard data)

|  |  |  |  |
| --- | --- | --- | --- |
| leaves floating | O - E | (O – E) 2 | (O – E) 2/E |
| 1 | -.7 | .49 | .09 |
| 2 | -.8 | .64 | .10 |
| 3 | -1.5 | 2.25 | .30 |
| 4 | -1.3 | 1.69 | .21 |
| 5 | -.2 | 4 | .43 |
| 6 | -.2 | 4 | .43 |
| 7 | .1.9 | 3.61 | .36 |
| 8 | -2.1 | 4.41 | .42 |
| 9 | -2.4 | 5.76 | .52 |
| 10 | -2.9 | 8.41 | .71 |

Sum total for column ∑ = 3.57

**3.57 represents X2**

Use table in equations sheet to reject or accept null hypothesis based on the following:

Value to look at in Chi Square table: **Use 1 degree of freedom at the p .05 level**

**If the X2 value is greater than the value in table, REJECT null hypothesis.**

**If the X2 value is less than the value in table, ACCEPT null hypothesis.**

For my example data, Chi square value is 3.57 and table value is 3.84, so I should accept my null hypothesis that no difference exists between the experimental trial and the standard trial (even though the data LOOK different).

One catch… if your t-test is significant (p < .05), it overrides the Chi-square since it is a more powerful test than the chi square. If both statistical tests are accepted then that should be your final analysis decision.

Conclusions: Follow general guidelines on report guide.